

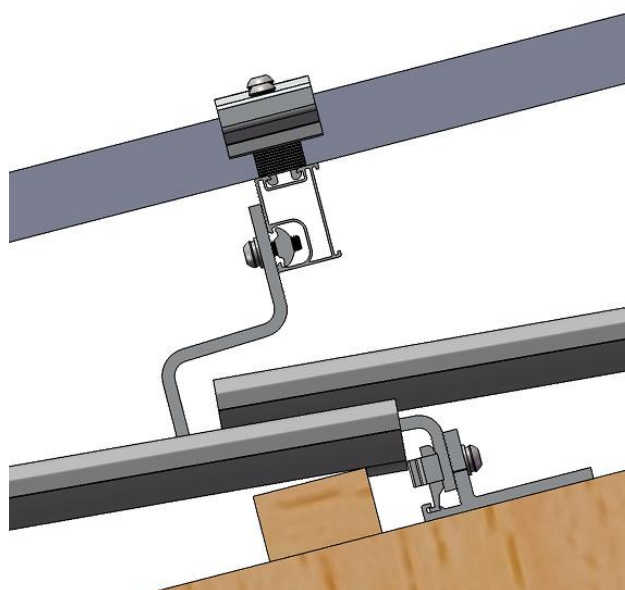
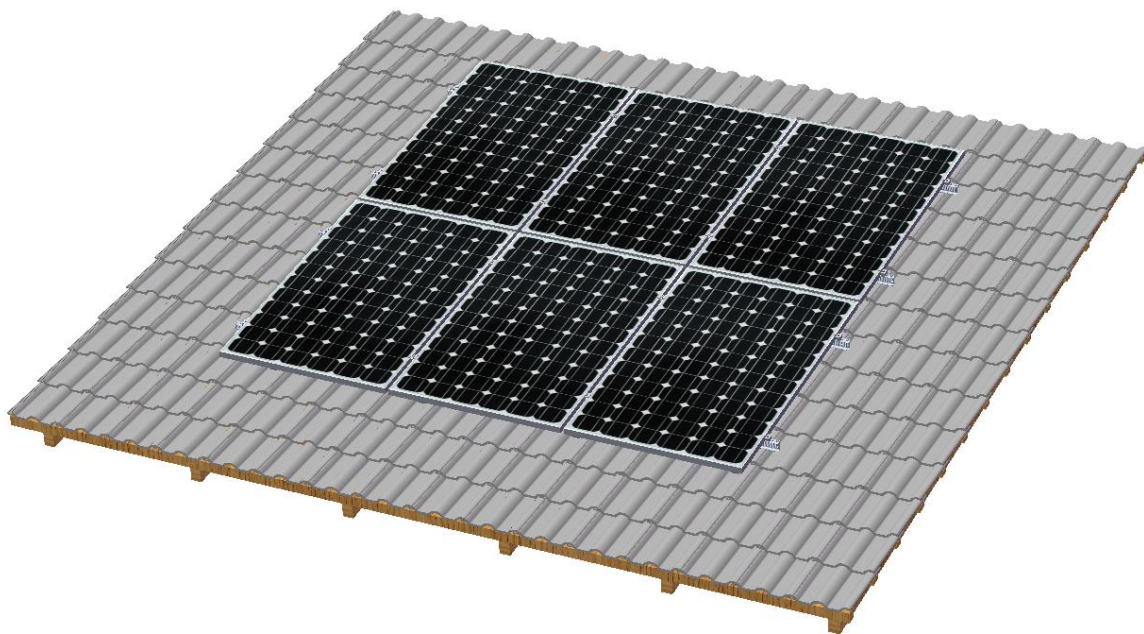
Mounting system instruction manual

1. Document Summary

Rev	Date	Description	Written by
1.0	May.12.2022	First Generation	Mao
1.1	August.28.2022	Delete the vertical spacing of the Roof Hooks and chapter 5	Mao
1.2	Oct.12.2022	Change the name of the roof hook	Wright

PV-ezRack® SolarRoof™ DC for ER-I-DC/02A/CS(PV-ezRack SolarRoof Pro, Adjustable Tile Interface, with carbon steel main body)

Code-Compliant Planning and Installation Guide
Complying with Eurocodes 0-9 and VDI 6012



1. Introduction

The Clenergy PV-ezRack® SolarRoof™ DC has been developed as a universal PV-mounting system for roof-mounting on pitched and flat roofs. The use of patented aluminium base rails, M-Module technology and telescopic mounting technology eliminates custom cutting and enables fast installation.

Please review this manual thoroughly before installing PV-ezRack® SolarRoof™ DC. This manual provides:

- 1) Supporting documentation for building permit applications relating to PV-ezRack® SolarRoof™ DC Universal PV Module Mounting System,
- 2) Planning and installation instructions.

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The PV-ezRack® SolarRoof™DC parts, when installed in accordance with this guide, will be structurally sound and will meet the Eurocodes and VDI 6012 standard. During installation, and especially when working on the roof, please comply with the appropriate Occupational Health and Safety regulations. Please also pay attention to any other relevant State or Federal regulations. Please check that you are using the latest version of the Installation Manual, which you can do by contacting Clenergy via email on sales@clenergy.com.com.

The installer is solely responsible for:

- Complying with all applicable local or national building codes, including any that may supersede this manual;
- Ensuring that PV-ezRack and other products are appropriate for the particular installation and the installation environment;
- Using only PV-ezRack parts and installer-supplied parts as specified by the PV-ezRack project plan. (substitution of parts may void the warranty and invalidate the letter of certification);
- Recycling: Recycle: according to the local relative statute.
- Removal: Reverse installation process.
- Ensure that there are no less than two professionals working on panel installation.
- Ensure the installation of related electrical equipment is performed by licenced electricians.
- Ensuring safe installation of all electrical aspects of the PV array.
- Ensuring that the roof, its rafters/purlins, connections, and other structural support members can support the array under building live load conditions;
- Ensuring that screws to fix interfaces have adequate pullout strength and shear capacities as installed;
- Maintaining the waterproof integrity of the roof, including selection of appropriate flashing;

The mounting rack is applicable for following conditions.

- Tile roofs from 15deg to 60deg tilt
- Building height $\leq 12\text{m}$
- Installations in Wind zone 1 to Wind zone 4
- Installations in Snow zone 1 to Snow Zone 3
- All wood fasteners need to follow the local building regulations, e.g. DIN 1052
- Max altitude: according to the calculation report
- Max Span width: according to the calculation report
- Only approved and certified wood screws are to be used for roof hook installations
- Min distance for wood screws from wood edges according to EN 1995-1-1
- The hooks can only be mounting on the roof rafters but not on the roof lath (the horizontal wood beams that hold the tiles)

Design Standards:

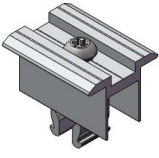
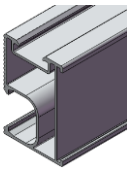
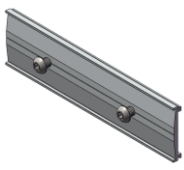
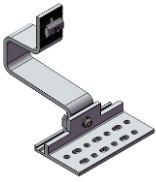



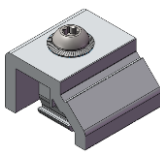
- BS EN 1990:2002 Basis of Structural Design
- DIN EN 1991-1-4. Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions
- DIN EN 1991-1-3 : 2004 EUROCODE 1: ACTIONS ON STRUCTURES - PART 1-3: GENERAL ACTIONS - SNOW LOADS
- VDI 6012 Blatt 1.4 Integration of decentralised and regenerative energy systems in buildings
- EN 1995-1-1: Eurocode 5: Design of timber structures

2. Tools and Components

2.1 Tools

- Angle Grinder with Stone Disk
- Screw Driver (for M8 Torx Screw and bolt)
- Torque Spanner
- Torx L-key or the equivalent
- 5m Tape
- String & Marker Pen

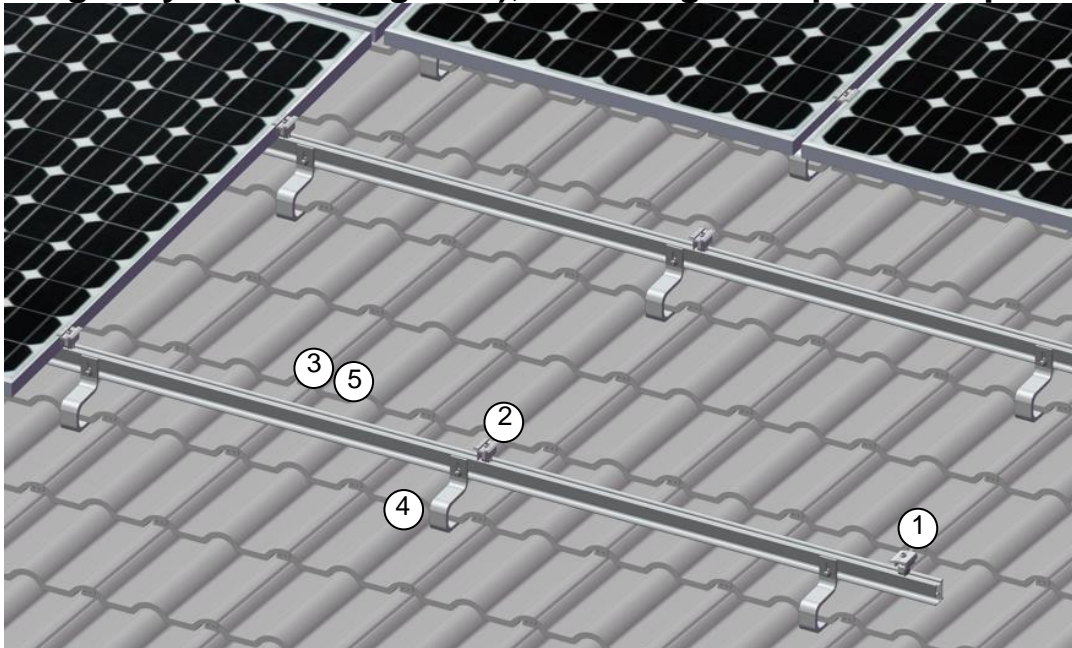
2.2 Components

Component list			
			
ER-EC-DC/30/35B End Clamp for DC Rail L50	IC-DC30/35/SRP/G/B SRP Inter Clamp 30&35mm L50	ER-R-DC50/2500 DC Rail 50, L2500m	ER-SP-DC50/200 Splice for DC Rail 50, L200mm
			
ER-I-DC/02A/CS PV-ezRack SolarRoof Pro, Adjustable Tile Interface, with carbon steel main body	EZ-CAP-DC50 Cap for DC Rail 50	EZ-GL-DC/S Grounding Lug for DC Rail, side mount	GC-DT Grounding Clip
			
EZ-CC-DC Cable Clip	ER-CC-DC50/2 Cross Connector for DC Rail 50, version 2.0	ER-RC-DC50/G/2 Grounding Rail Clamp for DC Rail	

3. System Overview

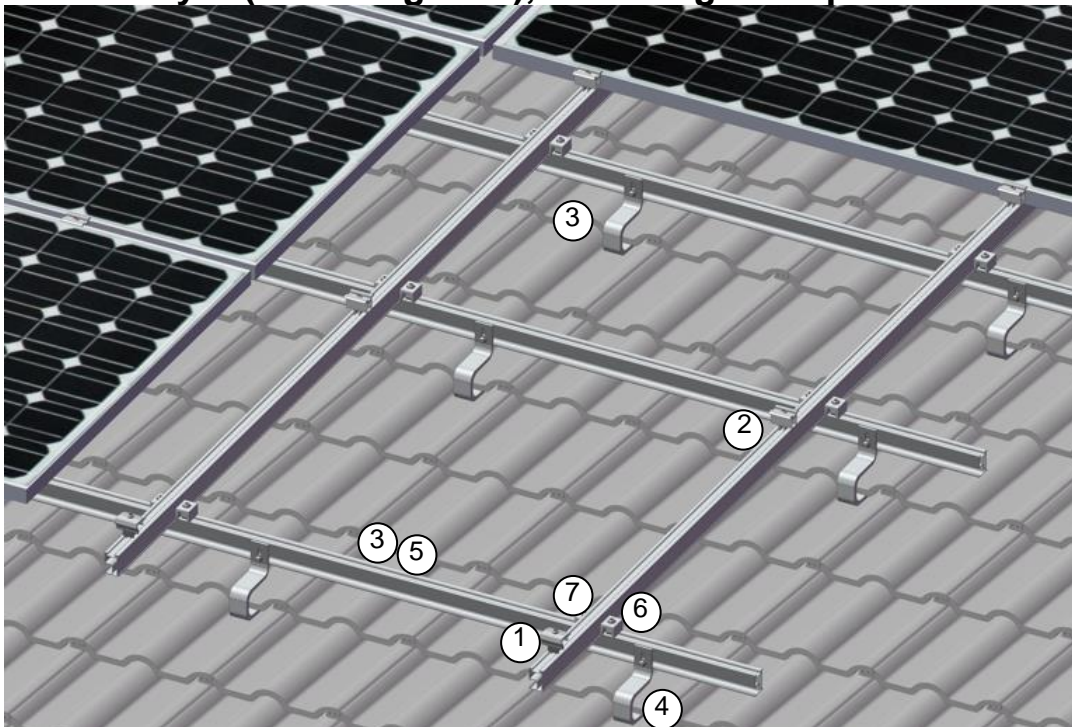
3.1 Overview of PV-ezRack SolarRoof DC

- Single layer (mounting rails), mounting solar panels in portrait



1) End Clamp 2) Inter Clamp 3) DC Rail 50 4) Tile interface 5) Splice for DC Rail 50

- Double layer (mounting rails), mounting solar panels in landscape



1) End Clamp 2) Inter Clamp 3) DC Rail 50 4) Tile interface 5) Splice for DC Rail 50

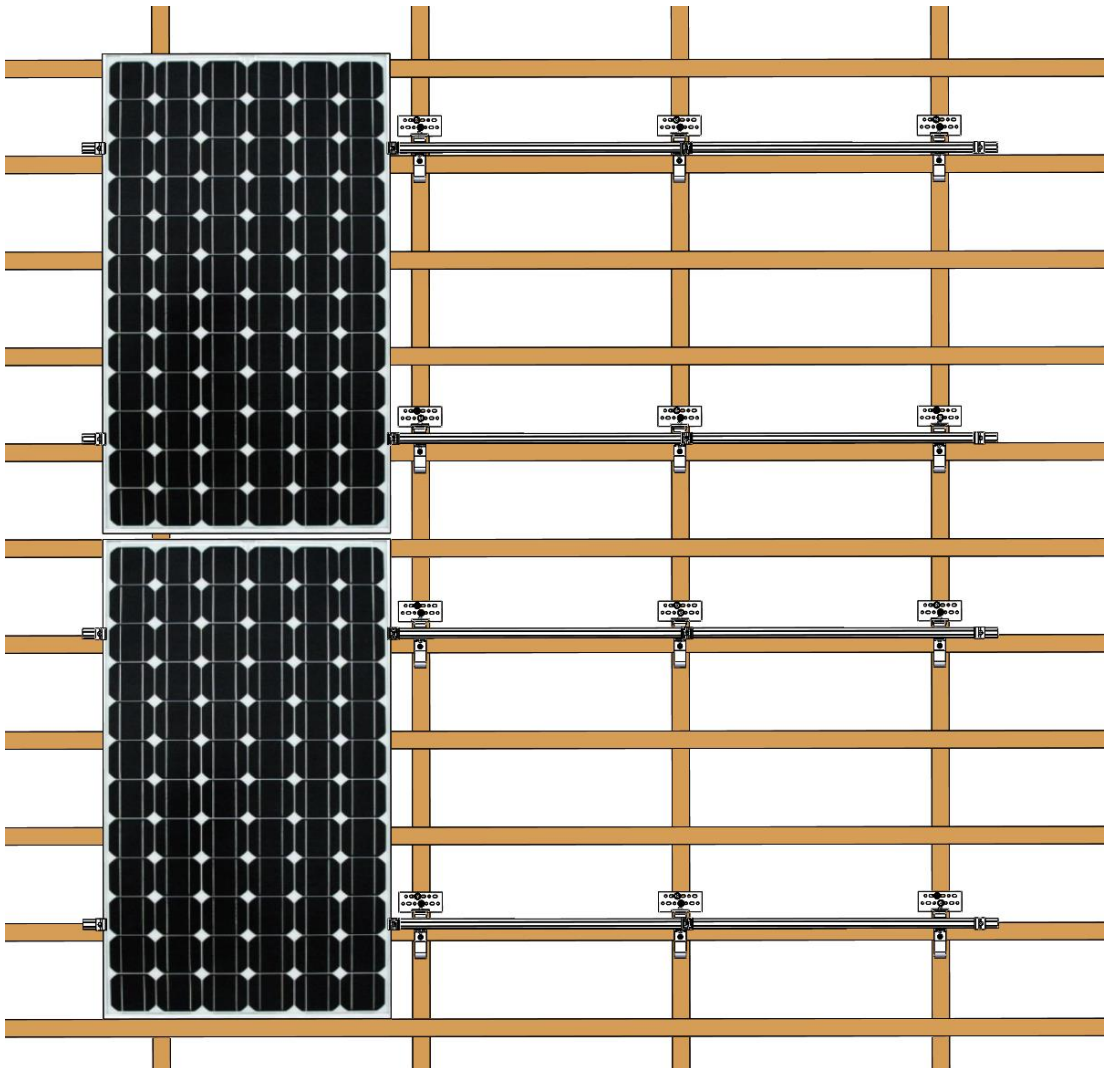
6) Cross Connector 2.0 7) Grounding Clamp 2.0

Installation Scenarios:

For the static calculation and span distance detail, please refer to below calculation tool.

- "01-MR calculation tool - V1.0 for ER-I-DC/02A/CS(PV-ezRack SolarRoof Pro, Adjustable Tile Interface, with carbon steel main body)".

4. Installation Instruction

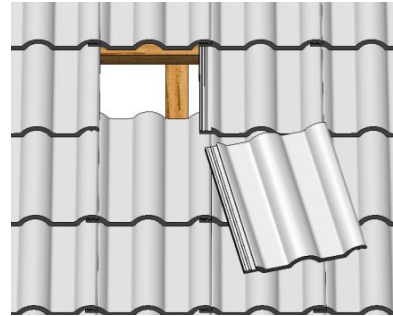


- The min. distance from the mounting rack to the roof edges is 3cm.
- Assess the horizontal spacing of the Roof Hooks.
- Check the allowed max. spacing as provided by the Calculation Tool "01-MR-calculation tool - V1.0 for ER-I-DC/02A/CS(PV-ezRack SolarRoof Pro, Adjustable Tile Interface, with carbon steel main body)".
- Always check the installation manual of the PV-Module you use in order to determine the allowed fixing points on the module frame.

4.1 Roof Hook Installation

4.1.1

Determine the positions of the roof hooks according to your plans.
 Remove the roof tiles at the marked positions or, if possible, simply push them up slightly.



4.1.2

Fix the roof hooks to the rafter using M8*100 Torx screw as shown in the figure on the right following screws installation guide below:

- Use a 3/8" Torx Socket.
- Use a powered or cordless screw driver.
- Fit the driver bit into the screw and place at the fastening position.
- Apply consistently firm pressure (end load) to the screw driver until the screw is fastened.

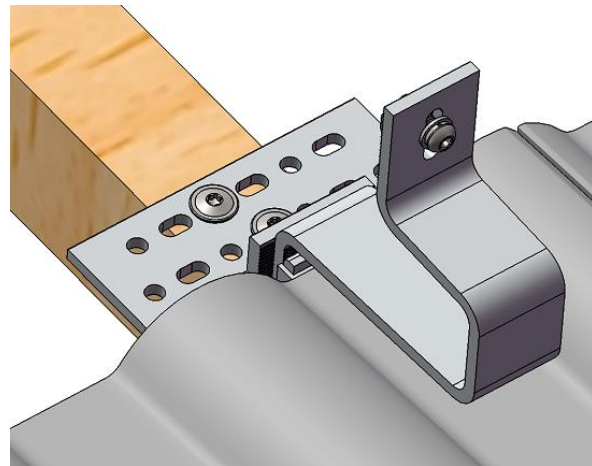
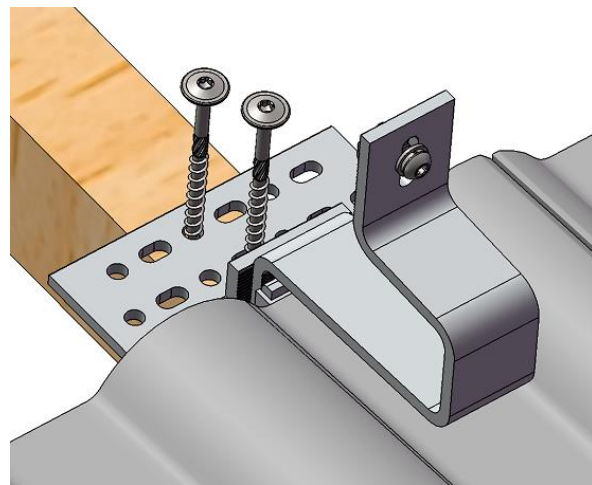
Note:

If the rafter width is less than 5 cm, 6mm wood screw with rosette washer as shown in the figure on the right is needed.

Only approved and certified wood screws are to be used for roof hook installations. A predrill 5mm dia. Hole is needed and the distance between the screw to rafter edge is 3xd (screw dia.)

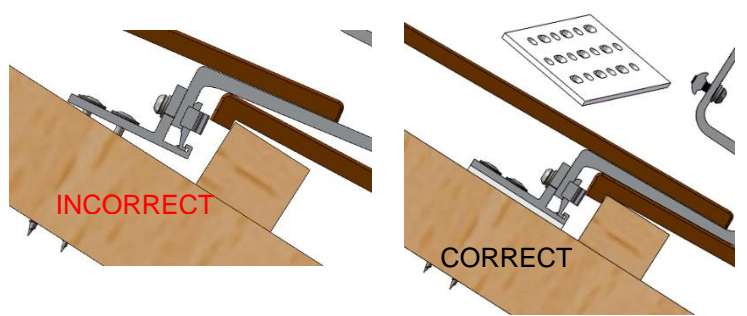
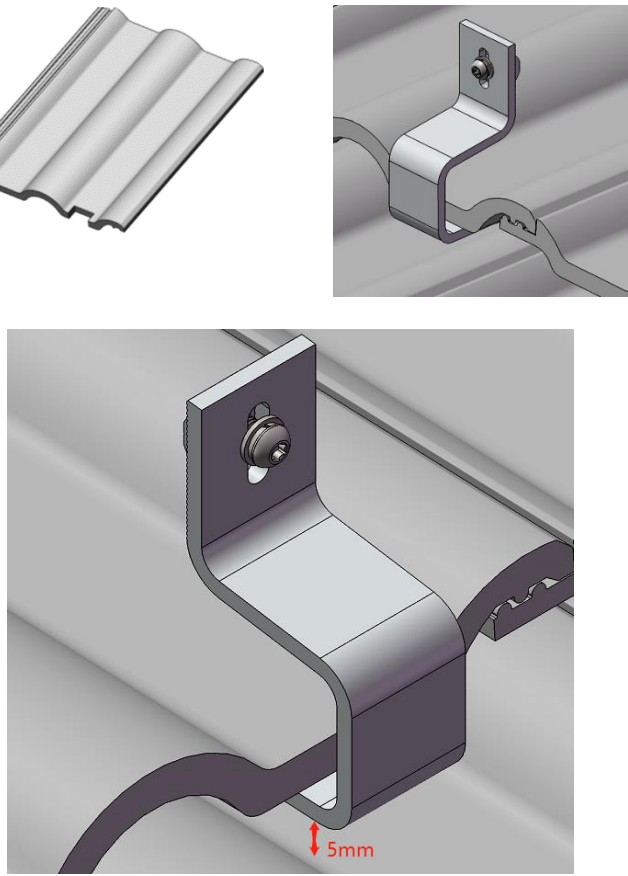

The hook can only be mounted on the roof rafter, cannot be mounted on tile lath.

The wood connections are to be made according to EN 1995-1-1:2004+A1:2008



6,5mm x 100mm + Rosettenscheibe 

Gewindelänge für das Rechenblatt 55mm

<p>4.1.3 Use buffer plates to lift the tile bracket so that the base does not rest on the tile, as shown in Figure</p>	
<p>4.1.4 If necessary, use an angle grinder to cut a recess in the upper tile covering the roof hook at the point where the roof hook extends so that the tiles can be placed properly.</p>	
<p>4.1.5 Caution! Do not use fitted roof hooks as a ladder, as this extreme point load could damage the tile below.</p>	

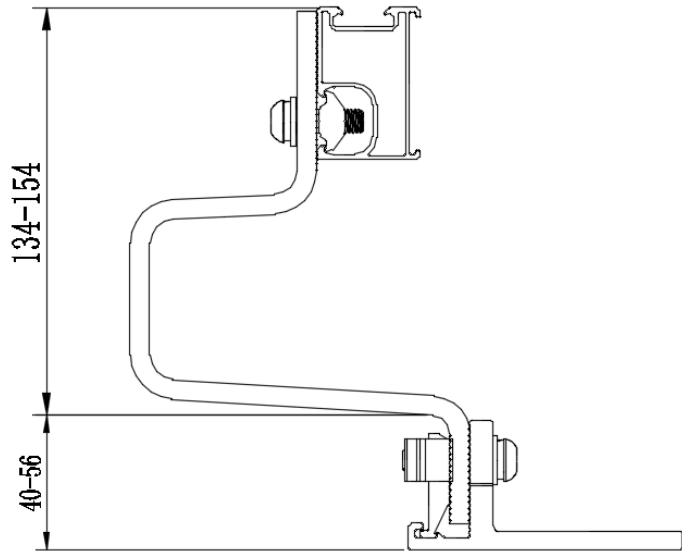
4.2 Rail Installation

4.2.1

Insert the w module into the channel of the rail, and fasten the M8 Torx screw loosely with Torx L-key or the equivalent.

Please refer to the figures on the right for height adjustment.

The roof hook should not protrude over the rail after the adjustment.



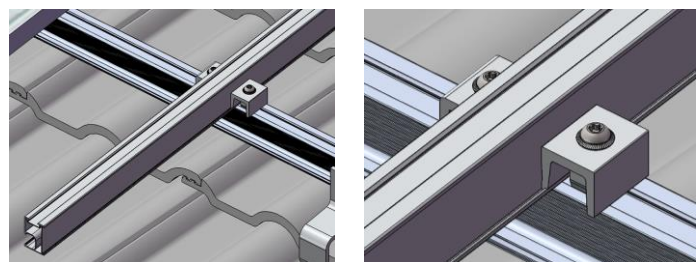
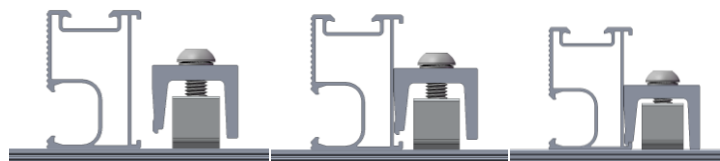
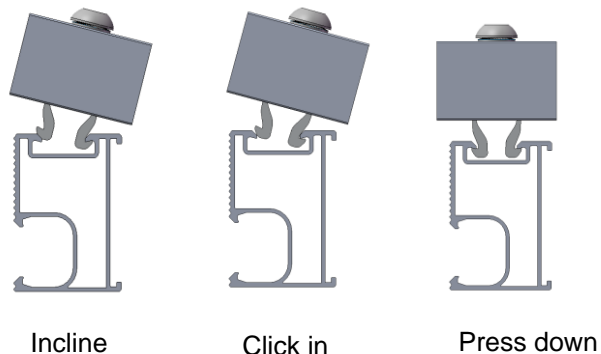
4.2.2

In the cases that double layer (cross rail) is required for the installation, please use cross connector and grounding clamp to fix the top and the bottom rails.

Place the rails on the bottom rails and fix two rails together.

When using the cross connector 2.0 ER-CC-DC50/2, Click the M-module into the top channel of DC rail 50 at any given point, move the cross connector 2.0 close to the rail and fasten the M8 Torx screw loosely as shown on the right figures.

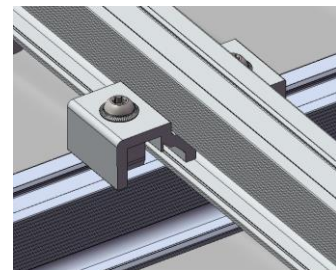
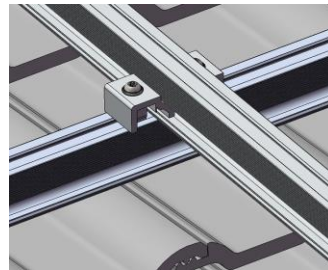
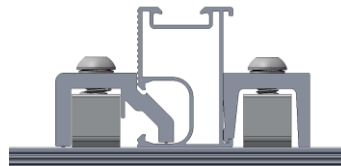
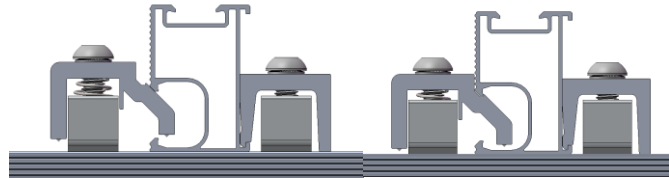
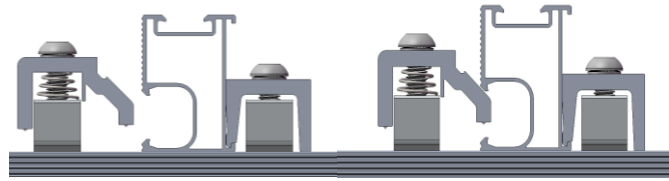
When using the grounding clamp 2.0 ER-RC-DC50/G/2, click the M-module into the top channel of DC rail 50 at any given point, move the grounding clamp 2.0 towards to the opening



channel of the rail, and make sure the grounding clamp 2.0 close to the rail edge, and fasten it with M8 Torx screws loosely.

Now adjust the top rails properly, and fasten all M8 Torx screws tightly.

The recommended torque is 14N·m.



4.2.3

Now the rails installation are completed as shown on the right figures.



Rails are perpendicular to the rafter



Double layer (cross rail)

4.3 PV Modules installation

Place PV Modules on rails, fix with end clamps and inter clamps. Click the M-module of the clamps into the top channel of rail as shown on the right figures.

Step 1 Place the first PV Module on Rails according to your plan and apply the End Clamps to fix it and then fasten lightly using Torx L-key or the equivalent as shown on the right Figure.

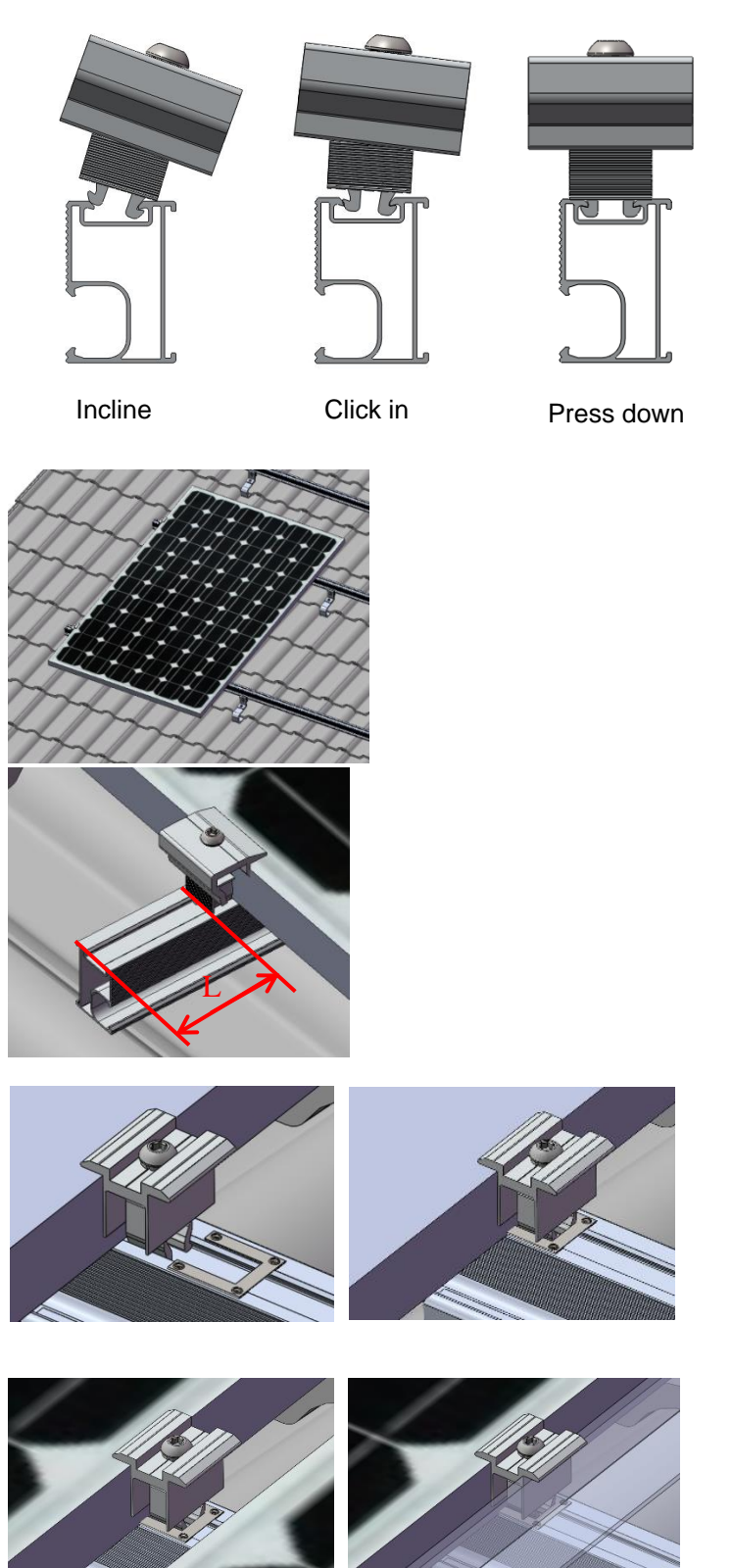
Note: The distance L from end clamp to the end of the rail shall be greater than 10mm

Step 2 Slightly lift the PV Module and slide Inter Clamps and Grounding Clips into position. The teeth on Grounding Clip will automatically align when the Inter Clamp is properly installed as shown on the right Figures.

Step 3 loosely place the next framed PV Module into the other side of the Inter Clamp and Grounding Clip as shown on the right Figure.

Important Notes:

- To fix the Grounding Clip properly, ensure the frames of PV Modules are completely pressed against the Inter Clamp and Grounding Clip. Visually check that Grounding Clips are positioned properly.

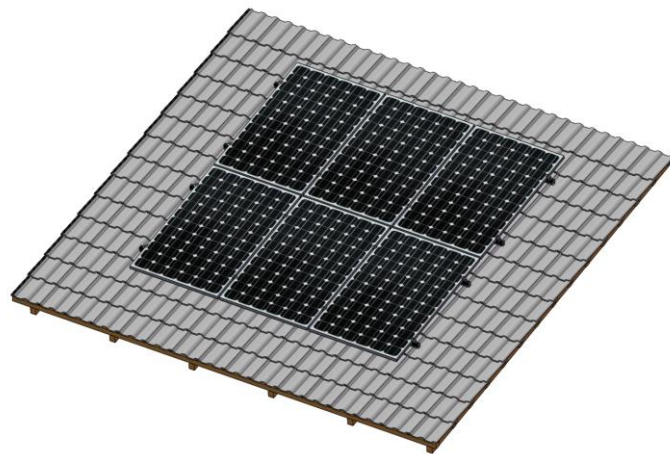
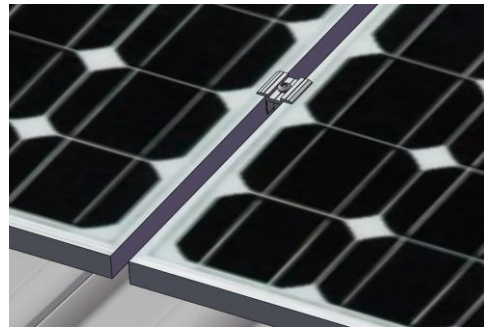
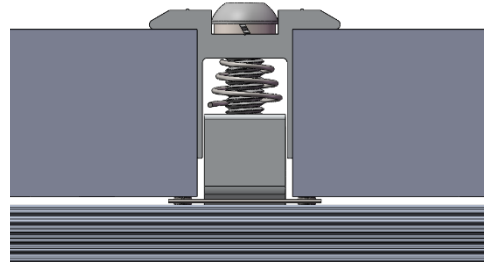


- **Grounding Clips are intended for SINGLE USE ONLY! Only fasten the bolts down when the position of PV Module is finalized. (Only slightly tighten bolts to keep PV Modules in place prior to the final check)**

Step 4 Maintain 20mm vertical gap and 20mm horizontal gap between the two adjacent rows of PV Modules. You can use two Inter Clamps to separate two PV Modules, and remove after installation as shown on the right Figure.

Double check if all PV Modules are fixed properly.
 Fasten all the M8 Torx screw tightly.
 The recommended torque is 14N·m.

Now the PV modules installation is completed as shown on the right.

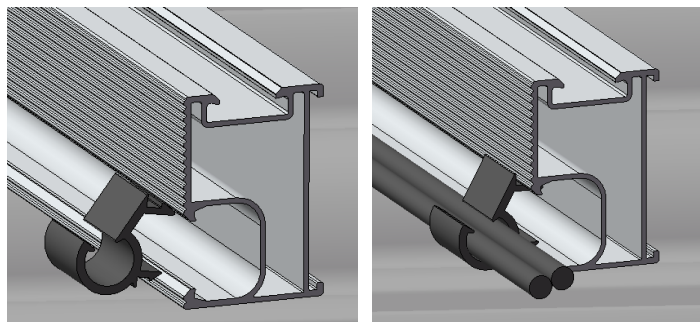


4.4 Accessory installation

4.4.1

Cable clip installation

Click the cable clip into the rail. Insert the cables into the holes of cable clips as shown on the right figures.



4.4.2

Grounding Lug installation

Put the w module into the side channel of rail, and fasten the M8 Torx screw tightly within 14N.m.

Insert the copper wire into the grounding lug and fasten the M8 Torx screw tightly with 8N.m. as shown on the right figures.

